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DOCUMENTS EXPEDITING PROJECT

PROPOSED TENNESSEE-TOMBIGBEE WATERWAY

SEPTEMBER 18, 1951.—Reported to the Committee on Appropriations

Mr. KERR, from the Subcommittee on Deficiencies and Army Civil Functions, submitted the following

REPORT

The Subcommittee on Deficiencies and Army Civil Functions submits the following report of its investigation of the proposed Tennessee-Tombigbee Waterway.

SUMMARY AND RECOMMENDATION

The proposed Tennessee-Tombigbee Waterway has received the attention of Congress for many years, and was authorized in the River and Harbor Act of July 24, 1946, on the basis of the 1945 report of the Chief of Engineers. This report advised Congress that there was a favorable benefit-cost ratio of 1.05. In 1947, the Corps of Engineers revised this upward to 1.13. The investigative staff of this committee intensively studied the entire project and has reported that the ratio is far below unity, being 0.27. The cost of the project as most recently estimated by the Corps is $179,000,000. This figure, in the opinion of the subcommittee, is considerably lower than the cost for the project and the additional improvements which will be required if the project were built.

The subcommittee strongly doubts the validity of both components of the Engineers' benefit-cost ratio; that is, the subcommittee is of the opinion that the Engineers' computation of benefits, and of the cost of the proposed project, lack justification.

Although planning funds have been appropriated, construction funds have never been appropriated and, of course, construction of the project has not been initiated. This project cannot be justified by the statutory criterion of a favorable benefit-cost ratio unless economic conditions in the area drastically change.

Recommendation: That additional planning funds should not be appropriated for the proposed Tennessee-Tombigbee Waterway, and in no event should funds be appropriated for the initiation of construction. With respect to the unexpended planning funds heretofore appropriated, such funds should be withdrawn from this proposed project.

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HISTORY OF PROPOSED PROJECT

The proposed Tombigbee Waterway was surveyed in 1875, 1913, 1923, and 1932. None of the reports resulting from these surveys was favorable. The project was resurveyed in 1935 and a recommendation made for further surveying.

In 1939 the Chief of Engineers, then Maj. Gen. J. L. Schley, submitted a report to Congress, printed as House Document No. 289, Seventy-sixth Congress, first session. General Schley did not affirmatively recommend the project, but instead said:

> I have no doubt that benefits of value to national defense, from enhancement of land values, and from increased use of recreational areas will be produced. Furthermore, provision of a direct water route to the Gulf of Mexico, from the Tennessee Valley may hasten the development in that valley resulting from the navigation project and electric-power system now being constructed there by the Federal Government. The large amount of construction involved in this connecting waterway to the Gulf would provide substantial direct employment over a period of 8 years and large orders to cement and steel mills and to the lumber industry. *All these intangible or indirect benefits must be considered in addition to the direct savings in transportation costs in order that this project will show a substantial excess of benefits over costs. They are difficult to evaluate and appear to me to be questions falling within the realm of statesmanship to which the Congress can best assign the proper values.*[1] [Emphasis supplied.]

It was evident to Congress from this report that the project could not be justified by the statutory criterion, a favorable benefit-cost ratio, unless intangible and arbitrary values such as national defense ($600,000), enhancement of local land values ($275,000), and recreation ($100,000), were included in the ratio. In congressional hearings and debates, Senators and Congressmen objected to these intangibles, and they have been dropped in subsequent consideration of the project.

On January 2, 1945, the House Rivers and Harbors Committee by resolution requested the Chief of Engineers to resurvey the project again, and submit a new report. The Chief of Engineers did so, and his report dated September 29, 1945, was submitted to Congress and printed as House Document No. 486, Seventy-ninth Congress, second session. This report stated that the ratio of benefits to costs was 1.05 to 1, and affirmatively recommended construction of the project. The project was authorized in the River and Harbor Act of July 24, 1946, based on this report.

Although General Schley in the 1939 report had advised Congress that the wisdom of the construction of the project was one for decision by the statesmen of Congress, the Chief of Engineers in the 1945 report did not inform Congress of the extreme doubt entertained by one member of the Board of Engineers for Rivers and Harbors. (This board was established by Congress in 1902 as its agent for the purpose of evaluating the wisdom of constructing proposed river and harbor and flood control projects.) The board member summarized his doubt on August 18, 1945, as follows:

> The Tombigbee-Tennessee connection is essentially a long-range project having only secondary local importance and the extent to which it would be utilized is conjectural. It depends on overcoming the inertia of established business enterprises and water transportation agencies; on the vision of regulatory agencies engaged in public convenience and necessity; and on the effectiveness of the measures that will be taken by existing overland carriers to stifle potential competition from the waterway. The project has repeatedly been advocated before Congress and the adequacy of the plans and the soundness of the economics

[1] H. Doc. 289, p. 8, par. 6.

in previous reports have been vigorously assailed by opponents. The present report will doubtless undergo keen and critical analysis. In the preparation of the report the preliminary computations oscillated between favorable and unfavorable and the final benefit-cost ratio is close to unity.

The 1945 report of the Chief of Engineers did not advise Congress of this board member's reservations with respect to the proposed project, and it appears that this information was not brought to the attention of Congress until this committee conducted an investigation of the proposed project and held lengthy hearings in May and June of 1951.

The investigative staff of the House Appropriations Committee investigated this proposed project in 1950. The staff engaged in this study was composed of two engineers, an economist, and an investigator. The staff studied the files of the Corps of Engineers. In addition, members of the staff visited the site of the proposed project and interviewed numerous people in the general area of the project. The staff submitted its report to the committee in January 1951. On April 3, 1951, the Civil Functions Subcommittee furnished a copy of the staff report to the Corps of Engineers. The Corps of Engineers prepared a report answering the staff report, and submitted its report to the committee on April 23, 1951.

ESTIMATED COST OF THE PROJECT

The Corps of Engineers has computed the construction cost of the proposed project at various times as follows:

1939	$66,000,000
1945	116,000,000
1950	179,264,000

The investigative staff of the committee computed the 1950 estimated construction cost to be $205,540,000. For the convenience of the committee, there is printed in the appendix to this report a detailed breakdown of the cost comparisons.

BENEFIT-COST RATIO OF THE PROJECT

In addition to the divergence between the committee staff and the Corps of Engineers as to construction costs, there is even a greater divergence in the estimated benefit-cost ratio for the project, as shown in the following table:

Benefit-cost ratios

	Estimated annual savings	Estimated annual cost	Ratio
Corps of Engineers:			
1945	$6,251,000	$5,745,000	1.05 to 1.
1947	7,883,000	6,964,000	1.13 to 1.[1]
Investigative staff of House Appropriations Committee:			
1950	2,843,000	10,597,000	0.27 to 1.

[1] An error in the constituents of this ratio of only 13 percent in the direction of overstatement of benefits or understatement of costs would destroy the economic justification of this project.

In the hearings extensive testimony and evidence was considered for the purpose of establishing objectively the underlying factors which would make up a reasonably reliable benefit-cost ratio for the consideration of the committee. Unless the estimated ratio were to exceed unity, that is that the estimated benefits will exceed the

estimated cost, no further appropriations should be made for this project. Planning funds have been appropriated from time to time, totalling $920,000. No construction funds have ever been appropriated. As stated above in the summary, construction funds should *not* be appropriated and, in addition, no further planning funds should be used on this project.

The subcommittee is fully satisfied that the benefit-cost ratio for this project is substantially below unity. As pointed out, the investigative staff of the committee estimated the ratio to be 0.27. Since the computation of ratios for projects such as this are based upon a large number of imponderables and are therefore purely hypothetical, there is no reason for this subcommittee to endeavor to compute a precise ratio, but it is sufficient to state the unanimous view of the subcommittee that the ratio for this proposed project is below the statutory criterion.

DEFENSE DEPARTMENT AND ATOMIC ENERGY COMMISSION NOT INTERESTED IN PROJECT

During the many years that this project has received the consideration of Congress, both in committees and on the floor of both Houses, it has often been said that this project is vital to national defense and to the Atomic Energy Commission. This contention has received careful consideration. The Department of Defense informed the committee in writing on December 26, 1950, that it does not consider this project "as essential to national defense at this time." In addition, the Atomic Energy Commission conveyed its view on May 23, 1951, that it does not have "any particular interest in the construction" of the proposed project. (Both of these letters are printed in the hearings.)

PROJECT DESCRIPTION

The proposed Tennessee-Tombigbee Waterway has its northern terminus at Pickwick Pool on the Tennessee River. From that point the project will require an overland cut to the south for a distance of 39 miles through the divide separating the Tennessee watershed from the Tombigbee watershed. This divide cut will require the excavation of 100,000,000 cubic yards of earth and the Corps of Engineers has estimated that this operation alone will require from 5 to 6 years.[2] From the southern end of the divide cut, it will then be necessary to construct a canal running an additional 41 miles in a southerly direction to the point where it will reach the east fork of the Tombigbee River. From that point again in a southerly direction down the Tombigbee River to its confluence with the Warrior River at Demopolis, it will be necessary to make the river navigable for a distance of 180 miles. A representative of the Corps of Engineers testified in a prior hearing [3] that the Tombigbee River is "completely obsolete" as a waterway. In the hearings just concluded, the Chief of Engineers advised the subcommittee that the river is not now navigable.

In the 39 miles of the divide cut portion of the project between the Tennessee River and the Tombigbee River, the project proposes a channel 150 feet wide and 12 feet deep. In the 41 miles of the canal, the project encompasses cutting a canal 170 feet wide and 12 feet

[2] The Corps' 1945 ratio of 1.05 was based on a construction period of 5 years. If the construction were to require 8 years, the ratio would drop to 1.02; and if 10 years were required, the ratio would decrease to 1.

[3] Hearings before Subcommittee of House Appropriations on Army Civil Functions Bill for fiscal year 1949.

deep. Throughout the distance of 180 miles from the southern terminus of the canal to Demopolis, it is proposed that the channel of the waterway will be 170 feet wide and 9 feet deep.

The proposed project is purely one of navigation, and the Corps of Engineers has conceded that flood control, power, and conservation have no application to it.

The basic concept of the project is that it will provide a water route from the Gulf of Mexico inland, as an alternate to the Mississippi River. It has been urged that the downstream current of the Mississippi River, averaging 2½ miles an hour, can well be supplemented for upstream traffic by the proposed waterway through canalized, slack water. The theory is that the river traffic from the upper Mississippi and its tributaries, the Missouri, the Illinois and the Ohio, will move downstream on the Mississippi River with the current, and will return back up the proposed waterway in slack water. There are no locks on the Mississippi River between its confluence with the Ohio at Cairo and New Orleans, whereas there will be a minimum of 10 locks on the proposed waterway between its southern terminus at Demopolis and its northern terminus at Pickwick Pool on the Tennessee. To this figure of 10 locks, however, must be added 4 locks between Demopolis and Mobile, and 1 lock at New Orleans on the Gulf Intracoastal Waterway going east toward Mobile.

It is readily perceivable that the project encompasses much more than the 260 miles from Demopolis to the Tennessee River.

THE PROJECT IN ITS ENTIRETY

The construction cost figures submitted to Congress by the Corps of Engineers in 1939, 1945, and in every year from 1945 up to the present time, have been predicated solely upon the 260 miles from Demopolis to the Tennessee, exclusive of the cost of improving and maintaining the additional 377 miles from New Orleans to Demopolis. All of the computations employed by the Corps of Engineers to achieve a favorable benefit-cost ratio have their basis on this invalid premise. For this reason alone, the favorable benefit-cost ratio as reported by the Corps of Engineers is defective. As pointed out, the project visualizes the divergence of upstream Mississippi traffic from New Orleans 156 miles across the Mississippi Sound to Mobile, then 221 miles up the Mobile and Tombigbee Rivers to Demopolis where the project starts, and then 260 miles to the Tennessee. (As an additional justification, the Corps of Engineers has included in its computations traffic which is now using overland routes by rail and by truck, which are separate and apart from the diverted Mississippi traffic.) The subcommittee gave close study and attention to the predicted diversion of Mississippi River traffic and has found that the latest construction cost figure of $179,000,000 submitted by the Corps of Engineers falls far short of the physical requirements for the magnitude of the project.

THE PREDICTED DIVERSION OF TRAFFIC FROM THE MISSISSIPPI

When river traffic moves downstream from the Mississippi to New Orleans, it has been predicted by the Corps that the traffic will then move east 156 miles to Mobile and then north 481 miles to the Tennessee River. In so doing, the river traffic will be required to brave the often heavy seas of the Mississippi Sound and then pass through

3 locks between Mobile and Demopolis which average 52 by 285 feet and the new 110 by 600-foot lock at Demopolis. It is proposed that the 10 locks on the Tombigbee Waterway will be 110 by 600 feet, in order to equate them with the standard size lock of the Ohio River which is 110 by 600 feet. This will mean that in order for the project to operate, it will be necessary that the 3 locks below Demopolis be replaced at additional substantial cost. Some idea of the cost can be gained from considering the cost of recently reconstructing the lock at Demopolis from 52 by 285 feet to 110 by 600 feet. When the Corps of Engineers requested construction funds for the Demopolis lock, they estimated the cost would be $16,935,000. That figure multiplied by 3 for the 3 locks below Demopolis, totals $51,000,000 to be added to the $179,000,000 construction cost of the project. Since the benefit-cost ratio, as computed by the Corps of Engineers, for the project is 1.13, an under-estimate of 13 percent will destroy the ratio. The $51,000,000 in itself represents an under-estimate of 30 percent. And if the cost of the Demopolis lock is included in the computation of the ratio for this project, the ratio decreases still farther below unity.[4]

The operating conditions across Mississippi Sound unquestionably enter into any cost consideration for the proposed project. It is beyond dispute that the present river traffic on the Mississippi River, tow boats, tug boats, and river boats, are not presently adapted to the heavy seas apt to be encountered in the 156-mile trip from New Orleans to Mobile. The Corps of Engineers recognizes that any such vessels desiring to use the proposed project will have to undergo physical alterations in order to be properly equipped and adapted to the Mississippi Sound conditions. Even if the barge operators should be willing to make such adaptations—and the barge operators in large part expressed their opposition to the proposed project to the Corps of Engineers—it appears clear that substantial money will have to be expended to establish harbors of refuge in the Mississippi Sound. The Corps of Engineers have affirmatively considered this matter and have been advised directly by the barge operators of the need for such harbors. At the present time, conditions are such that a barge operator desiring to leave New Orleans and go across the Sound 156 miles to Mobile awaits clear weather for the 35-hour duration of the trip before leaving New Orleans. In those cases where barge equipment moving across the Sound is buffeted by heavy seas, and a hawser snaps, the tug is often unable to get back to the barge to reestablish the hawser.

In view of such conditions as these, it appears that downstream Mississippi River traffic would have little encouragement to use the proposed project for upstream movement unless large sums of money were spent for protection in Mississippi Sound. The Corps of Engineers has conceded that the cost of such protection has not been included in the $179,000,000 estimated cost of the project.

Just as the construction cost of the proposed project, as used by the Corps of Engineers in their computation of the benefit-cost ratio is unrealistic, the Corps' computation of benefits is out of touch with reality.

[4] The 4 locks between Mobile and Demopolis are a part of the existing Warrior-Tombigbee Waterway and their cost is assessable in part against the Warrior-Tombigbee. However, the part of their cost which is properly assessable against the proposed Tennessee-Tombigbee Waterway, has been ignored by the Corps of Engineers. The investigative staff of the committee in computing the construction cost of the project likewise did not include this substantial item of cost in its figures, but only because the staff desired to use the same basis of computations as used by the Corps.

PURPORTED TRANSPORTATION SAVINGS

In computing the benefits to be derived from the proposed project, two prime factors are involved. The first one is, how much money per ton would be saved by using the proposed project, and the second one is, how much tonnage would move on it. The computations of the Corps with respect to both factors are exaggerated, and the favorable benefit-cost ratio as computed by the Corps of 1.13 cannot be supported, even in its benefit component.

The Engineers' computations of savings per line-haul ton are predicated upon a mathematical hypothesis of the speed of movement of river traffic on the upstream Mississippi as against the upstream proposed waterway, and the result is shown in the following formula computed by the Corps of Engineers on May 26, 1945:

The foregoing speed elements were resolved into three representative elements by retaining those for the Mississippi River downstream and upstream and constructing a composite figure of canalized and still water, the result being:

	Miles per hour
Mississippi River, downstream	8.2125
Mississippi River, upstream	3.1835
Composite, canalized-still water	4.3943

It is estimated that the running cost to the barge line increases or decreases according to the average speed maintained by its tows as an indication of the effort expended in the movement thereof and that for identical loads carried equal distances under various waterway operating conditions the average costs would vary accordingly. With this in mind and the speed shown for the Mississippi River downstream being the fastest, representative of the least operating effort, or 100, the following operating-cost ratios obtain:

	Miles per hour
Mississippi River, downstream	1.000
Mississippi River, upstream	2.579+
Canalized-still water composite	1.868+

These operating-cost ratios are used subsequently to obtain relationships in commodity unit costs.

The assumptions in this formula cannot find support in reality, and yet the Corps used this formula to compute purported savings for traffic movement on the proposed waterway, as shown in the following tables contained in the Corps' 1945 report which affirmatively recommended construction of project:

TABLE NO. 18.—*Line-haul costs of barge transportation on selected sections of the Mississippi River system, Mississippi Sound, and the proposed Tombigbee-Tennessee Waterway, based on 1939 operations*

Section	Line-haul cost per ton
Existing route:	
Morgan City to Plaquemine	$0.08375
Plaquemine to Cairo	1.78573
New Orleans to Cairo	2.01901
Baton Rouge to Cairo	1.74031
Cairo to dam No. 53	.03716
Dam No. 53 to Paducah	.04337
Proposed route:	
Morgan City to New Orleans	.14806
Baton Rouge to New Orleans	.10804
New Orleans to Mobile	.37366
Mobile to Paducah	.89014
Paducah to dam No. 53	.04337
Dam No. 53 to Cairo	.01440

TABLE NO. 19.—*Typical savings per ton in line-haul costs via proposed Tombigbee-Tennessee Waterway as alternative route to upstream movement on the lower Mississippi River*

Origin	Destination	Line-haul cost per ton		Savings per ton via Tombigbee-Tennessee
		Via Mississippi	Via Tombigbee-Tennessee	
Morgan City, La	Paducah, Ky	$1.95	$1.41	$0.54
Do	Cairo, Ill	1.87	1.47	.40
Baton Rouge, La	Paducah, Ky	1.82	1.37	.45
Do	Cairo, Ill	1.74	1.43	.31
New Orleans, La	Paducah, Ky	2.10	1.26	.84
Do	Cairo, Ill	2.02	1.32	.70

THE PREDICTED BENEFITS ARE EXAGGERATED

The subcommittee gave careful attention to the underlying factors upon which these tables are based and has concluded that neither table is reliable. This is readily established by considering the following simple facts.

First. These tables are based upon the movement of 3,500 revenue tons in 8 barges powered by a 1,000 to 1,200 horsepower tow boat.[5] Such a tow, in the Engineers' computations, would move from New Orleans 156 miles across the Mississippi Sound to Mobile and then 221 miles up the Mobile and Tombigbee Rivers to the beginning of the proposed waterway at Demopolis, and then 260 miles up the proposed waterway to the Tennessee River. The movement would have to be made within the time period, or speed per hour, contained in the mathematical formula appearing above. The fact of the matter is that the operating costs per ton-mile are widely divergent from the Corps' estimate as reported to Congress in the above tables and this conclusion is based upon evidence which the Corps had and has in its possession.

There is no question but that the Corps of Engineers in its own study of the operating conditions learned that a tow of 8 barges cannot be moved across the Mississippi Sound from New Orleans to Mobile, but instead that the tow would have to be split into two separate sections, each section powered by a separate tow boat or tug boat. With the addition of this extra power, the operating costs rise proportionately. The Engineers estimated, as shown above in table 18, that the line-haul cost from New Orleans to Mobile would be 37 cents. The actual operating costs for this movement is at least 75 cents, or twice the estimate of the Corps. The 75 cents figure was obtained by an engineer of the Corps who personally interviewed the barge operators at New Orleans, Mobile, and other points in that area.

[5] Hearings, p. 35.

The barge operators were seriously concerned about the congestion which would be caused in the lock at New Orleans in the event the proposed project were built, and the Chief of Engineers in the hearings conceded that there may be congestion there. The barge operators estimated a delay of 6 to 7 hours and possibly more. Each hour of delay bites further into the Corps' estimated savings for the reason that such savings are predicated upon speed of movement. But the lock situation becomes even more aggravated when the traffic reaches Mobile. Between Mobile and the Tennessee River the tows will have to pass through a minimum of 14 locks. The first three of the locks would be approximately 52 by 285 feet. The Corps arbitrarily—and this characterization is used in their own records—calculated a time of one hour to pass through such locks. Yet their own figures show that the time required to pass through existing locks of the same size on the lower Cumberland River is 3½ hours lockage time at each lock, and that each barge and the tow boat must be locked through separately. Representatives of the Corps admitted in the hearings that their computations of savings do not include double locking or auxiliary power. Since both double locking and auxiliary power would be required for even the tow of 3,500 tons which the Corps characterized as the "optimum tow," the Corps' estimated savings must be further decreased substantially.

There was considerable discussion in the hearings with respect to improvement in the size and motive power of Mississippi River traffic. The barge operators on the Mississippi have found that integrated, high speed tows, with horsepower of 1,800 or more, can be profitably used on the Mississippi. When such tows as these have completed their downstream trip on the Mississippi and arrive at New Orleans, they could not use the proposed waterway at any saving because, as the Corps frankly concedes, any tows larger than 3,500 tons or of horsepower of 2,000 or more would move more economically on the open Mississippi than on the proposed waterway.[6]

Second. The Engineers have estimated that a large tonnage of certain specified commodities will move on the proposed waterway and in their computations of the benefit-cost ratio the Engineers have multiplied the purported line-haul savings discussed above by the estimated tonnage of these commodities. The subcommittee has given careful attention to the evidence on this subject and has concluded that the tonnage figures used by the Corps of Engineers are exaggerated. The following table shows clearly the wide divergence between the Corps' tonnage figures and the tonnage figures of the committee's investigative staff, and its drastic effect on the benefit-cost ratio:

[6] Hearings, p. 39.

Potential tonnage of commodities which might move on Tombigbee Waterway

Six principal commodities	Engineers' 1945 tonnage estimate					Engineers' 1947 estimate		Staff's [1] estimate (based on field investigation and 1949 waybill study)	
	Waybills 1939	Questionnaire	Mobile hearing	Preliminary total	Final 1945	Tons	Savings	Tons	Savings
Fertilizer	87,624	600	150,000	238,224	271,000	275,000	$740,000	5,000	$13,500
Bauxite	427,672	250,000		677,672	678,000	800,000	647,000		
Phosphate rock			250,000	250,000	250,000	400,000	563,000	300,000	422,200
Sugar	268,385	124,811	5,200	398,396	461,000	480,000	533,000	50,000	55,500
Gasoline	253,153	68,030	45,000	366,183	277,000	325,000	489,000	75,000	112,800
Alumina		253,410		253,410	253,000	253,000	144,000		
Other commodities	1,036,834	696,851	450,200	2,183,885	2,190,000	2,533,000	3,116,000	430,000	604,000
	1,184,923	272,048	164,052	1,621,023	1,809,000	2,030,000	3,267,000	870,000	1,396,000
Total	2,221,757	968,899	614,252	3,804,908	3,999,000	4,563,000	6,383,000	1,300,000	2,000,000
From Mississippi River					1,765,000	2,500,000	1,500,000	[2] 200,000	200,000
Grand total					5,764,000	7,063,000	7,883,000	1,500,000	[3] 2,200,000

[1] Investigative staff of House Appropriations Committee.
[2] 90 percent would be petroleum products for the upper Tennessee River.
[3] To translate the 1947 savings to 1949 basis the Engineers applied a ratio of 112 to 148 (1929=100). If this ratio is applied to savings on the new tonnage, the total benefits would increase to $2,843,000. The staff's ratio of benefit to cost is 0.27 (cost being greater than benefit). This is computed by using the savings or benefit figure of $2,843,000, and the Federal annual cost of $10,597,000.

Each of these commodities was discussed in the hearings. With respect to alumina which the Engineers estimated would move in an annual amount of 253,000 tons, it was established that alumina does not now move by barge because of its peculiar chemical properties, and that it is highly unlikely that it will be moved by water. The aluminum companies have had special hopper-type rail cars designed for the movement of alumina and rent these cars to the railroads. If any other commodity, such as cement, were loaded in the cars on the otherwise deadhead return trip, the cars would have to undergo expensive sand blasting before they could be used again for alumina. No barge has yet been designed or built which is adaptable to the transportation of alumina.

Bauxite is the ore from which alumina is processed. One large aluminum company does this processing in its plant at Mobile, and a second large aluminum company ships bauxite from Arkansas by railroad on almost a straight line to Muscle Shoals. Neither company uses water for the movement of bauxite and does not propose to do so.

In the case of gasoline and petroleum products, the area is amply served by pipe lines, highways and railroads. In the event there were to be a need for water transportation of petroleum on the proposed project, it should be borne in mind that petroleum is moved in industry-owned or contract bottoms and that there is a serious question, as developed in the hearings, as to whether the petroleum companies pass along to the public any savings that they might enjoy by virtue of water transportation. Likewise, there is a serious question as to whether the automobile manufacturers pass along to the public any savings accruing from water transportation of automobiles. It is interesting to note that 90 percent of the river traffic on the Mississippi River from 1942 through 1949 consisted of petroleum products.

The investigative staff of the committee contacted major petroleum producers, and they evinced little interest in the proposed project.

Sugar is moved predominantly by rail and little of it has turned to the water. Shippers favor land movement of sugar because the dampness concomitant with water transportation tends to harden sugar. Processed fertilizer is moved for short distances only, averaging 150 miles or less by truck, and not by water. Phosphate rock, a basic ingredient of fertilizer, is moved to some extent by water, but not in the area to be served by the proposed project, which, as it has been noted, is to be an alternative route to the Mississippi River.

Third. As one of the factors of their computations of estimated savings the Corps of Engineers analyzed some 7,000 rail movements of 1939, and in recomputing the ratio in 1947 to be 1.13, the Engineers selected 154 so-called "typical movements" as a partial justification for their increasing the ratio from the 1945 figure of 1.05. An examination of these 154 typical movements gives absolutely no support to this reasoning. Twenty-seven of the movements showed very little or no cost differential in favor of water transportation. Thirty-two movements were between points lying wholly within the areas of existing waterways. Seventy-three additional movements could also be made over existing waterways, principally by the Mississippi, Ohio, and Tennessee Rivers at costs less than rail rates. Another 19 movements are not likely to use the proposed waterway for varying

reasons. In summary, less than 10 percent of the 154 movements are likely to move by water.

The Engineers contacted the shippers themselves in questionnaires, and did not receive from the shippers any substantial assurances that they were in favor of the project. Only 17.3 percent reported their support of the project, and 81.1 percent were neutral. This is another strong indication that the computed commodity tonnages are unrealistic.

VENEZUELAN IRON ORE

One strong argument recently advanced to justify the proposed project is that ore from the new deposits of iron in Venezuela, presently being developed by United States Steel and Bethlehem Steel, would be shipped to Mobile by ocean vessels. At Mobile it would be transferred to barges which would then carry the ore up the proposed waterway to the Tennessee River, from there to the Ohio River, and from there to the inland steel centers of Pittsburgh, Youngstown, Gary, etc.

This is another subject which the committee carefully studied. United States Steel Company is presently building a tremendous processing plant just above Philadelphia on the Delaware River. Bethlehem Steel has recently completed a $30,000,000 plant at Baltimore. Both of these companies, recognizing that the ocean distance from Venezuela to Baltimore and Philadelphia is slightly less than the ocean distance to Mobile, plan to ship the ore by ocean vessels to Baltimore and Philadelphia. Some of the ore will be carried by rail inland to Pittsburgh from these points. (United States Steel does plan to ship a considerable quantity of ore to Mobile for movement up the existing Warrior-Tombigbee waterway to Birmingham.)

The rail rate from Baltimore or Philadelphia to Pittsburgh is $2.61 a ton. However, the total barge cost from Mobile to Pittsburgh over the proposed waterway would be $4.16 a ton. This figure may possibly be lowered to $3.69 a ton. In any event, it has been amply established that the cost of transporting iron ore by rail from Baltimore and Philadelphia inland to Pittsburgh is substantially lower than the water rate for movement of the ore on the proposed waterway.

OTHER IMPORTANT CONSIDERATIONS

The Federal Government has for many years subsidized the operations of the Federal Barge Lines on the Mississippi, Missouri, Illinois and Warrior-Tombigbee Rivers. Year after year the Federal Barge Lines has incurred substantial operating losses. The justification for the operations of these lines are twofold: First, pioneering on inland waterways, and second, offering less-than-bargeload service to shippers. There are few common carriers by water on the Mississippi and the Gulf Intracoastal Waterway. In 1950 out of a total of 775 carriers reporting to the Corps of Engineers, only 39 were common carriers. There were 12 contract carriers, and 724 carriers which were either industry-owned or bulk carriers under contract to industry. The common carriers have found less-than-bargeload shipment so unprofitable that they have embargoed such movements. This has a direct bearing on consideration of the proposed project because one of

the justifications for the project is service to the Tennessee River area. Ninety percent of the shippers on the Tennessee River, outside of petroleum shippers, require less-than-bargeload service. Since this type of service cannot be operated profitably today, the tremendous cost of the proposed project may result in providing a new waterway at Federal expense on which the movements to less-than-bargeload shippers would have to be subsidized by the Federal Government.

The way ports along the proposed waterway have a population of only 184,151, ranging from 3,000 to 127,151 (Mobile). The areas around these way ports and around the proposed waterway do not produce bulk commodities which would initiate their movement on the proposed project, with the possible exception of petroleum. By contrast, the way ports on the Mississippi River have a population of 1,075,403 from Cairo to New Orleans, and the areas which they serve are highly productive of river business.

THE DEFINITE PROJECT REPORT

The definite project report for the proposed Tennessee-Tombigbee Waterway has not been completed. On April 3, 1951, the Chief of Engineers advised this committee that a definite project report is completed for proposed projects before the Corps requests initial construction funds in order to obtain as sound a figure of construction cost as possible. In the hearings on this proposed project, the Chief of Engineers conceded that this sound policy had not been observed. The Corps of Engineers in fiscal year 1949 requested planning and construction money in the amount of $5,735,000, and in fiscal year 1951 requested $2,500,000 for the initiation of construction. These requests were made notwithstanding the fact that the definite project report for the entire project had not been completed. Corps representatives stated to the committee in the hearings that such requests for construction funds were based upon a completed definite project report for the Gainesville lock, the first of 10 locks on the project. At the committee's request, this so-called definite project report was produced. Upon examination it appears to be substantially less definitive and complete than required by outstanding orders and regulations and existing policy of the Corps of Engineers. This so-called report was little more than an accumulation of correspondence which clearly indicated that the proposed ultimate width for two-way navigation of the project is not 170 feet but instead 300 feet.

CONCLUSION

In the opinion of the subcommittee the proposed Tennessee-Tombigbee Waterway cannot be justified by the statutory criterion of a favorable benefit-cost ratio unless economic conditions in the general area of the project undergo a drastic change. Such a change is not presently foreseeable. It is fortunate that Congress has never appropriated funds for the initiation of the construction of this proposed waterway, and it is strongly recommended that the unused planning money which the Corps of Engineers has available for further planning of the project be withdrawn.

APPENDIX

Proposed Tombigbee Waterway—Federal investment and annual charges

Federal investment	Chief of Engineers				Staff, 1950 [1]
	1939	1945	1947	1950	
Estimated first cost of Corps of Engineers	$65,318,300	$116,741,000	$136,244,200	----------	$205,290,000
Estimated first cost of Coast Guard (navigation)	21,000	200,000	----------	----------	250,000
Total first cost	65,339,300	116,941,000	136,244,200	$179,264,000	205,540,000
Interest during construction period at 3 percent (one-half construction period)	7,689,400	8,771,000	----------	----------	30,831,000
Total investment	73,028,700	125,712,000	----------	----------	236,371,000
Federal annual charges:					
3½ percent of total Federal investment	2,556,000	----------	----------	----------	----------
3 percent of total Federal investment	----------	3,771,000	----------	----------	7,091,000
Amortization of Federal investment	238,400	1,168,000	----------	----------	2,133,000
Maintenance and operation	477,000	806,000	----------	----------	1,373,000
Total	3,271,400	5,745,000	6,964,000	8,370,000	10,597,000

[1] Investigative staff of the House Appropriations Committee.

Estimated Total Federal Cost of Tombigbee Project by Major Categories of Construction

There appears below a tabular statement of the estimated total Federal construction cost of the proposed waterway, as submitted by the Chief of Engineers and by the investigative staff of the House Appropriations Committee:

Item	1939 report, Chief of Engineers	1945 report, Chief of Engineers [1]	1950 report, staff [2]
Locks	$26,485,400	$46,324,000	$85,271,000
Dams	6,853,300	9,108,000	16,763,000
Channels and canals:			
Rectification and cut-offs	3,684,200	5,806,000	9,554,000
Lateral canal	11,053,300	14,898,000	19,359,000
Divide cut	13,806,300	36,000,000	66,485,000
Bridge, alterations, and new railway		2,134,000	4,265,000
Relocations:			
Railway	2,740,500	1,291,000	2,049,000
Utilities	17,000	80,000	100,000
Cemeteries		5,000	10,000
Rights-of-way and flowage:			
River		139,000	191,000
Canal	678,300	575,000	748,000
Divide		381,000	495,000
Aids to navigation	21,000	200,000	250,000
Total	65,339,300	[1] 116,941,000	[3] 205,540,000

[1] Increased size of locks, increased divide cut channel width and includes 35 percent for engineering and contingency except divide cut which includes 25 percent.

[2] The 1950 estimates of cost, submitted by the staff, are based on the same quantities and the same plans as were used by the Board of Engineers for Rivers and Harbors in the 1945 report, this being the only information available. Unit costs used in the staff's 1950 estimate were obtained by tabulating the following information: The average of bids submitted by the 3 low bidders, on various items, for construction of Cheatham Lock and awarded for construction in 1950; the average of bids submitted by the 3 low bidders on various items, for the gates, valves, and operating machinery for Cheatham Lock and awarded in June 1950; the average of bids submitted by the 3 low bidders on various items, for construction of the Jim Woodruff Lock and Dam, awarded in 1949; and average low bid prices submitted on preliminary excavation for, and the access road to the Demopolis Lock and Dam, awarded in 1951. The present day unit costs on various items were also obtained in both the Nashville and Mobile districts. From the average low bid prices received on recent comparable work together with the unit prices prevailing in districts where the waterway will be constructed, the unit prices of various pertinent items were established by the staff. The unit prices so established were used to arrive at the staff estimate of the cost of the project. Subject to the limitations imposed by the incompleteness of the basic data and by the absence of any final design of the proposed waterway this staff estimate is considered to be accurate as of July 1, 1950. The estimate makes no allowance for price increases subsequent to or caused by military operations in Korea. The estimate is therefore definitely conservative as of July 1, 1950.

The conservatism of the staff's estimate of the cost of the divide cut is readily demonstrated. This will require the excavation of 100,000,000 cubic yards of earth and rock. The staff estimated the cost at $66,485,000. In 1951 the Corps testified that the per cubic yard cost for common excavation was $0.64 and for rock excavation $3.16.

[3] Same design as in 1945 report; includes 35 percent for engineering and contingency except divide cut which included 25 percent.

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